FIG. 1

CONSTRUCTION OF IEEE 1394 BUS TO WHICH
CONVENTIONAL BUS ANALYZER IS CONNECTED
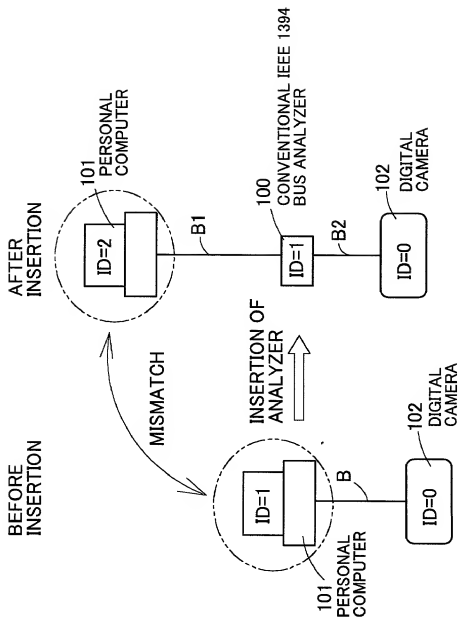
FIG. 2

CONSTRUCTION IN WHICH CONVENTIONAL BUS ANALYZER IS
CONNECTED TO IEEE 1394 BUS TO WHICH A NUMBER OF
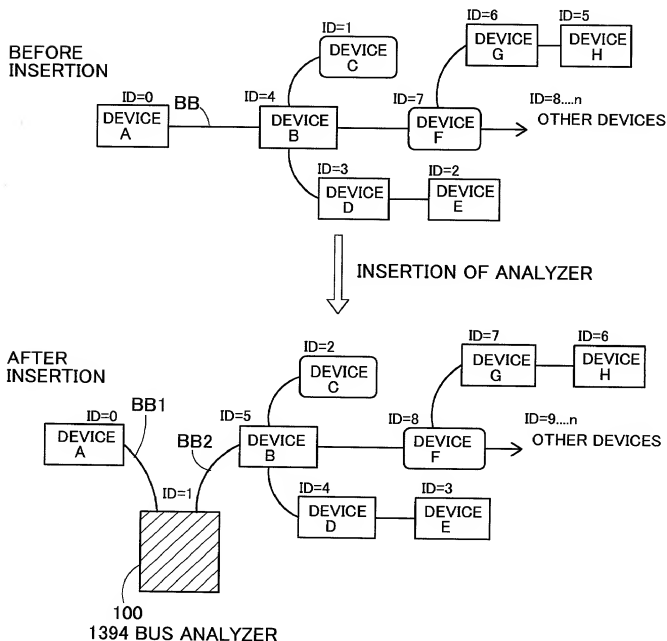DEVICES ARE CONNECTED

BEFORE
INSERTION

INSERTION OF ANALYZER

AFTER
INSERTION

100
1394 BUS ANALYZER

FIG. 3

CONSTRUCTION IN WHICH BUS ANALYZER OF FIRST EMBODIMENT
IS CONNECTED TO IEEE 1394 BUS

PERSONAL COMPUTER (ID=1) 101

DIGITAL CAMERA (ID=0) 102

IEEE 1394 BUS   IEEE 1394 BUS
B1

IEEE 1394 BUS
B2

PHYSICAL LAYER CIRCUIT (NO ID) 2A

DATA ANALYZING CIRCUIT 3

1A

1394 BUS ANALYZER
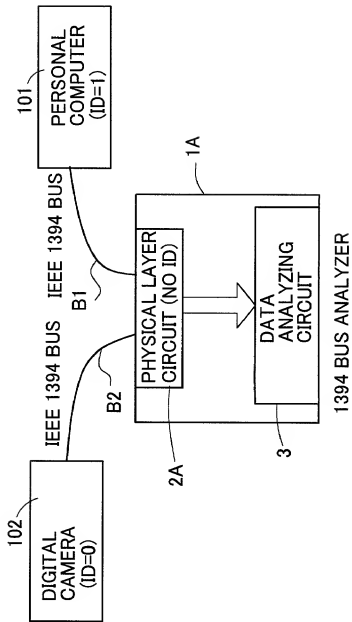
FIG. 4

STATE TRANSITION DIAGRAM SHOWING TREE—IDENTIFYING OPERATIION
IN FIRST EMBODIMENT

SELF-IDENTIFY

RECEIVE PARENT_HANDSHAKE

S6
RECEIVE PARENT_HANDSHAKE

S5
T2:
OUTPUT PARENT_NOTIFY TO THE
OTHER PORTS

S4
RECEIVE CHILD_HANDSHAKE

S2
RECEIVE PARENT_NOTIFY BY ONE PORT ‖
RECEIVE PARENT_NOTIFY BY BOTH PORTS

S3
RECEIVE PARENT_NOTIFY BY BOTH PORTS :
OUTPUT CHILD_NOTIFY TO ARBITRARY PORT
RECEIVE PARENT_NOTIFY BY ONE PORT :
OUTPUT CHILD_NOTIFY TO THE PORT
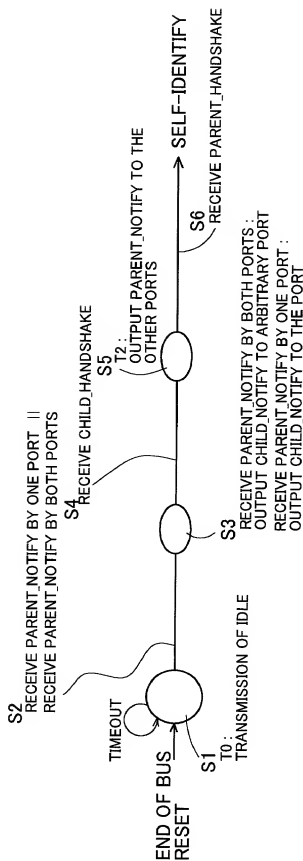
TIMEOUT

END OF BUS
RESET

S1
T0:
TRANSMISSION OF IDLE

FIG. 5

STATE TRANSITION DIAGRAM SHOWING SELF-IDENTIFYING
OPERATION IN FIRST EMBODIMENT

・PARENT : PORT HAVING HIGH ARBITRATION
・CHILD : PORT HAVING LOW ARBITRATION

NORMAL ARBITRATION

S14 ─ RECEIVE SELF_ID BY PARENT

S13
・OUTPUT IDENT_DONE TO PARENT
・TRANSFER SPEED SIGNAL RECEIVED
  BY CHILD TO PARENT
・TRANSFER SPEED SIGNAL RECEIVED
  BY PARENT TO CHILD PORT

RECEIVE IDENT_DONE BY CHILD
S12
RECEIVE SELF_ID BY CHILD

S10
RECEIVE SELF_ID_GRANT

S9
OUTPUT SELF_ID_GRANT
TO CHILD

S8
RECEIVE SELF_ID_GRANT BY PARENT

RECEIVE
SELF_ID
BY PARENT

S11
OUTPUT IDLE
&&
RECEIVE AND TRANSFER SELF_ID

S7
TRANSMISSION OF IDLE
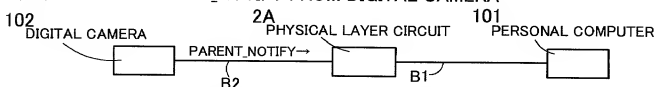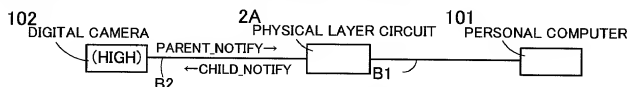
END OF TREE
IDENTIFICATION

END OF
SELF_ID

FIG. 6

TREE-IDENTIFYING OPERATION IN FIRST EMBODIMENT
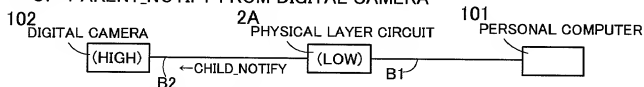(RECEIVE PARENT_NOTIFY BY ONE OF PORTS)
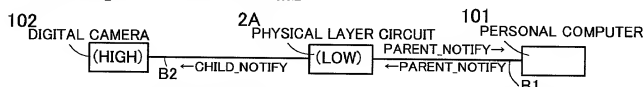
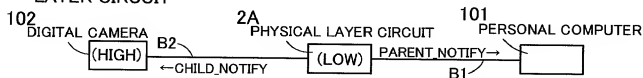(P1) RECEIVE PARENT_NOTIFY FROM DIGITAL CAMERA

102 DIGITAL CAMERA 2A PHYSICAL LAYER CIRCUIT 101 PERSONAL COMPUTER

PARENT_NOTIFY→
B2 B1

(P2) OUTPUT CHILD_NOTIFY TO DIGITAL CAMERA

102 DIGITAL CAMERA 2A PHYSICAL LAYER CIRCUIT 101 PERSONAL COMPUTER

(HIGH) PARENT_NOTIFY→
←CHILD_NOTIFY
B2 B1

(P3) RECEIVE CHILD_HANDSHAKE BY STOPPING OUTPUT
OF PARENT_NOTIFY FROM DIGITAL CAMERA

102 DIGITAL CAMERA 2A PHYSICAL LAYER CIRCUIT 101 PERSONAL COMPUTER

(HIGH) (LOW)
←CHILD_NOTIFY B1
B2
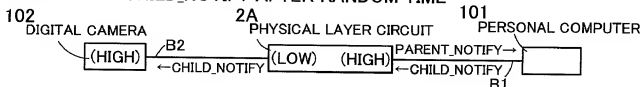
(P4) OUTPUT PARENT_NOTIFY TO THE OTHER PORT RECEIVE
ROOT_CONTENTION WHEN PERSONAL COMPUTER ALSO OUTPUTS
PARENT_NOTIFY AT THIS TIME

102 DIGITAL CAMERA 2A PHYSICAL LAYER CIRCUIT 101 PERSONAL COMPUTER

(HIGH) (LOW) PARENT_NOTIFY→
B2 ←CHILD_NOTIFY ←PARENT_NOTIFY
B1

(P5) STOP OUTPUTTING PARENT_NOTIFY FROM PERSONAL COMPUTER
BUT CONTINUOUSLY OUTPUT PARENT_NOTIFY FROM PHYSICAL
LAYER CIRCUIT

102 DIGITAL CAMERA 2A PHYSICAL LAYER CIRCUIT 101 PERSONAL COMPUTER

(HIGH) B2 (LOW) PARENT_NOTIFY→
←CHILD_NOTIFY B1

(P6) RECEIVE PARENT_HANDSHAKE WHEN PERSONAL COMPUTER
OUTPUTS CHILD_NOTIFY AFTER RANDOM TIME

102 DIGITAL CAMERA 2A PHYSICAL LAYER CIRCUIT 101 PERSONAL COMPUTER

(HIGH) B2 (LOW) (HIGH) PARENT_NOTIFY→
←CHILD_NOTIFY ←CHILD_NOTIFY
B1

(P12) STOP OUTPUTTING SIGNALS FROM BOTH PORTS, THEREBY
FINISHING TREE-IDENTIFYING OPERATION

102 DIGITAL CAMERA 2A PHYSICAL LAYER CIRCUIT 101 PERSONAL COMPUTER
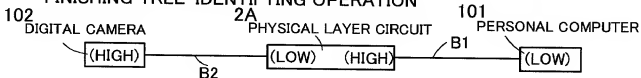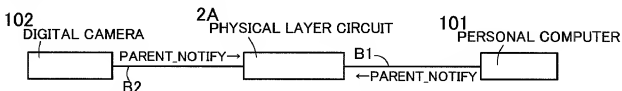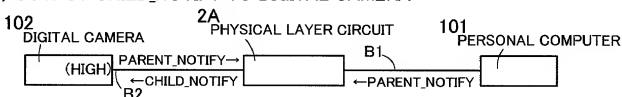
(HIGH) (LOW) (HIGH) B1 (LOW)
B2

FIG. 7

TREE-IDENTIFYING OPERATION IN FIRST EMBODIMENT
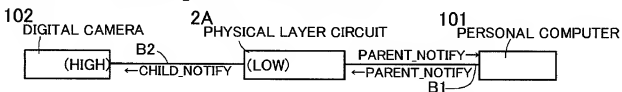(RECEIVE PARENT_NOTIFY BY BOTH PORTS)

(P7) RECEIVE PARENT_NOTIFY FROM BOTH DEVICES

(P8) OUTPUT CHILD_NOTIFY TO DIGITAL CAMERA


(P9) STOP OUTPUTTING PARENT_NOTIFY FROM DIGITAL CAMERA TO
      THEREBY RECEIVE CHILD_HANDSHAKE, AND OUTPUT PARENT_NOTIFY
      TO PERSONAL COMPUTER.
      RECEIVE ROOT_CONTENTION WHEN PERSONAL COMPUTER ALSO
      OUTPUTS PARENT_NOTIFY AT THIS TIME.

(P10) STOP OUTPUTTING PARENT_NOTIFY FROM PERSONAL COMPUTER
       BUT CONTINUOUSLY OUTPUT PARENT_NOTIFY FROM PHYSICAL
       LAYER CIRCUIT
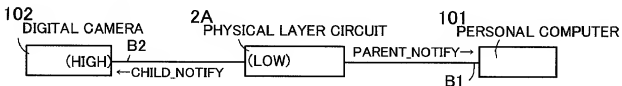
(P11) OUTPUT CHILD_NOTIFY FROM PERSONAL COMPUTER AFTER
       RANDOM TIME, THEREBY RECEIVING PARENT_HANDSHAKE
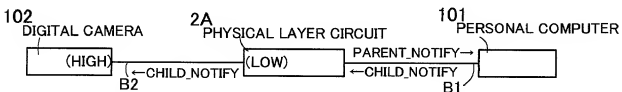
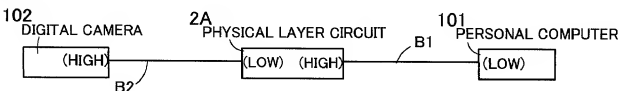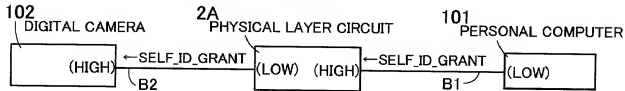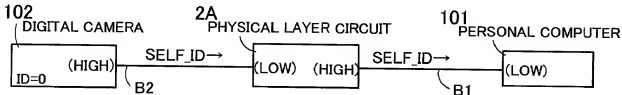(P12) FINISH TREE-IDENTIFYING OPERATION

FIG. 8

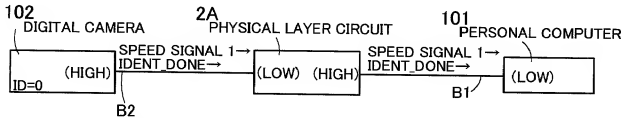## SELF-IDENTIFYING OPERATION IN FIRST EMBODIMENT

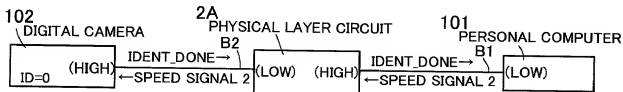(P13) RECEIVE SELF_ID_GRANT FROM PERSONAL COMPUTER AND
TRANSFER IT TO DIGITAL CAMERA

102 DIGITAL CAMERA   2A PHYSICAL LAYER CIRCUIT   101 PERSONAL COMPUTER

(HIGH) ←SELF_ID_GRANT (LOW) (HIGH) ←SELF_ID_GRANT (LOW)
B2   B1

(P14) RECEIVE SELF_ID PACKET FROM DIGITAL CAMERA AND
TRANSFER IT TO PERSONAL COMPUTER

102 DIGITAL CAMERA   2A PHYSICAL LAYER CIRCUIT   101 PERSONAL COMPUTER

ID=0   (HIGH) SELF_ID→ (LOW) (HIGH) SELF_ID→ (LOW)
B2   B1

(P15) RECEIVE IDENT_DONE PACKET AND SPEED SIGNAL FROM
DIGITAL CAMERA AND TRANSFER THEM TO PERSONAL COMPUTER

102 DIGITAL CAMERA   2A PHYSICAL LAYER CIRCUIT   101 PERSONAL COMPUTER

SPEED SIGNAL 1→   SPEED SIGNAL 1→
(HIGH) IDENT_DONE→   IDENT_DONE→
ID=0   (LOW) (HIGH)   (LOW)
B2   B1

(P16) RECEIVE SPEED SIGNAL FROM PERSONAL COMPUTER AND
TRANSFER IT TO DIGITAL CAMERA

102 DIGITAL CAMERA   2A PHYSICAL LAYER CIRCUIT   101 PERSONAL COMPUTER
B2   B1

IDENT_DONE→   IDENT_DONE→
(HIGH)   (LOW) (HIGH)   (LOW)
ID=0   ←SPEED SIGNAL 2   ←SPEED SIGNAL 2

(P17) RECEIVE SELF_ID PACKET FROM PERSONAL COMPUTER AND
FINISH SELF_IDENTIFYING OPERATION

102 DIGITAL CAMERA   2A PHYSICAL LAYER CIRCUIT   101 PERSONAL COMPUTER
B1

ID=0   (HIGH)   (LOW) (HIGH)   (LOW) ID=1
←SELF_ID   NO ID   ←SELF_ID
B2
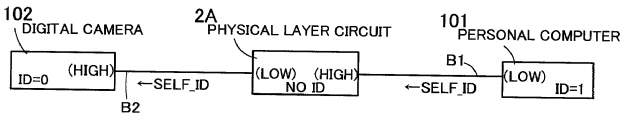
FIG. 9

FIRST MODIFICATION OF BUS ANALYZER IN FIRST EMBODIMENT
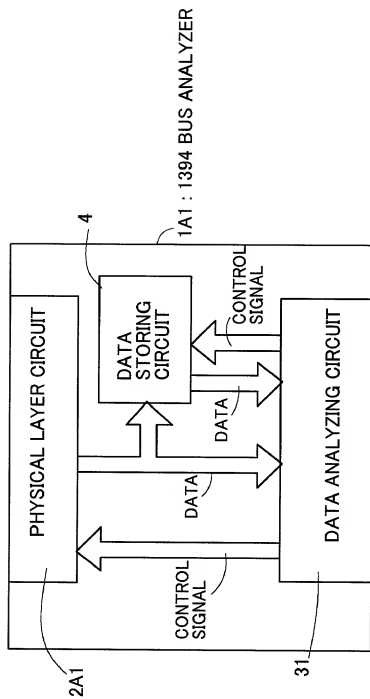
1A1 : 1394 BUS ANALYZER

PHYSICAL LAYER CIRCUIT

DATA STORING CIRCUIT

DATA ANALYZING CIRCUIT

CONTROL SIGNAL

DATA

DATA

CONTROL SIGNAL

2A1

31

4

FIG. 10

SECOND MODIFICATION OF BUS ANALYZER IN FIRST EMBODIMENT

PHYSICAL LAYER CIRCUIT

DATA CONDITION DETECTING CIRCUIT

DATA STORING CIRCUIT

DATA ANALYZING CIRCUIT

TRIGGER SIGNAL

CONTROL SIGNAL

CONTROL SIGNAL

CONTROL SIGNAL

DATA

DATA

2A2

4

5

32

1A2 : 1394 BUS ANALYZER

FIG. 11

THIRD MODIFICATION OF BUS ANALYZER IN FIRST EMBODIMENT

1A3 : 1394 BUS ANALYZER

PHYSICAL LAYER CIRCUIT

DATA

CONTROL SIGNAL

DATA TRANSFER CONTROL CIRCUIT

DATA ANALYZING CIRCUIT

DATA

CONTROL SIGNAL

2A3

6

33
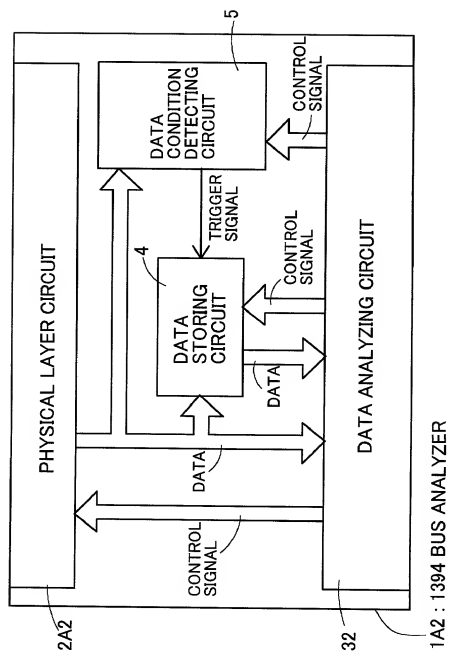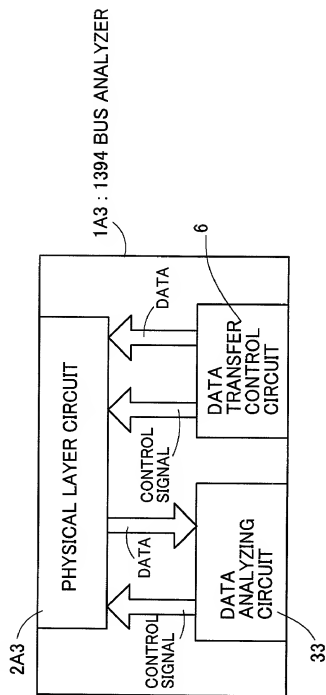
FIG. 12

FOURTH MODIFICATION OF BUS ANALYZER IN FIRST EMBODIMENT

1A4 : 1394 BUS ANALYZER

2A4

PHYSICAL LAYER CIRCUIT

DATA STORING CIRCUIT — 4

DATA TRANSFER CONTROL CIRCUIT — 6

DATA ANALYZING CIRCUIT — 34

CONTROL SIGNAL

DATA

CONTROL SIGNAL

DATA

DATA

FIG. 13

FIFTH MODIFICATION OF BUS ANALYZER IN FIRST EMBODIMENT

PHYSICAL LAYER CIRCUIT

DATA STORING CIRCUIT — 4

DATA TRANSFER CONTROL CIRCUIT — 6

DATA TRANSMISSION CONDITION DETECTING CIRCUIT — 7

DATA ANALYZING CIRCUIT — 35

2A5

CONTROL SIGNAL

DATA

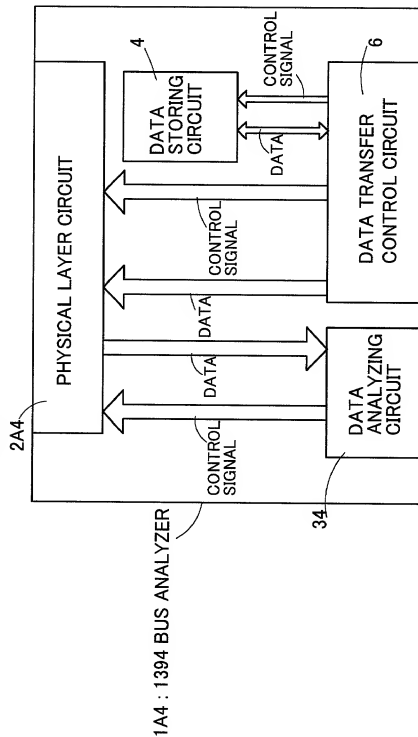TRIGGER SIGNAL

CONTROL SIGNAL
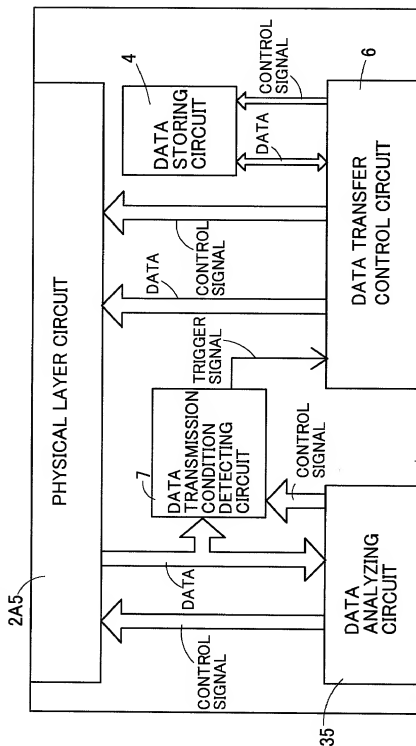
CONTROL SIGNAL

1A5 : 1394 BUS ANALYZER

FIG. 14

SIXTH MODIFICATION OF BUS ANALYZER IN FIRST EMBODIMENT

1A6 : 1394 BUS ANALYZER

FIG. 15

FIRST CONSTRUCTION EXANPLE OF IEEE 1394 BUS TO WHICH
BUS ANALYZER OF SECOND EMBODIMENT IS CONNECTED

```
┌─────────────────────────┐
│  PERSONAL COMPUTER      │
│       (ID=n+1)          │ ──── 103
│         or              │
│   DIGITAL CAMERA        │
│       (ID=0)            │
└─────────────────────────┘
            │  B3 : IEEE 1394 BUS
            
┌─────────────────────────────┐
│  ┌──────────────────────┐   │
│  │ PHYSICAL LAYER       │   │  2B1
│  │ CIRCUIT              │   │
│  │   (ID=0,1,2···,n)    │   │
│  └──────────────────────┘   │
│       3                     │
│  ┌──────────────────────┐   │
│  │  DATA                │   │
│  │  ANALYZING           │   │
│  │  CIRCUIT             │   │
│  └──────────────────────┘   │
└─────────────────────────────┘
  1B : 1394 BUS ANALYZER
```
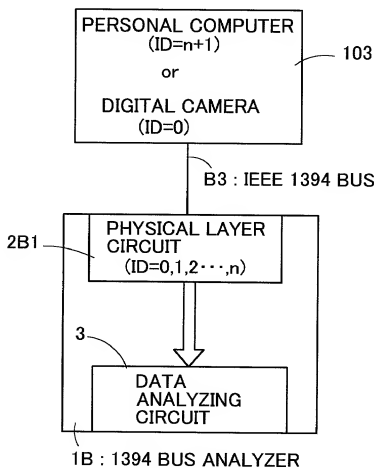
FIG. 16

STATE TRANSITION DIAGRAM SHOWING SELF-IDENTIFYING OPERATION IN FIRST CONSTRUCTION EXAMPLE OF SECOND EMBODIMENT

- PARENT : PORT HAVING HIGH ARBITRATION
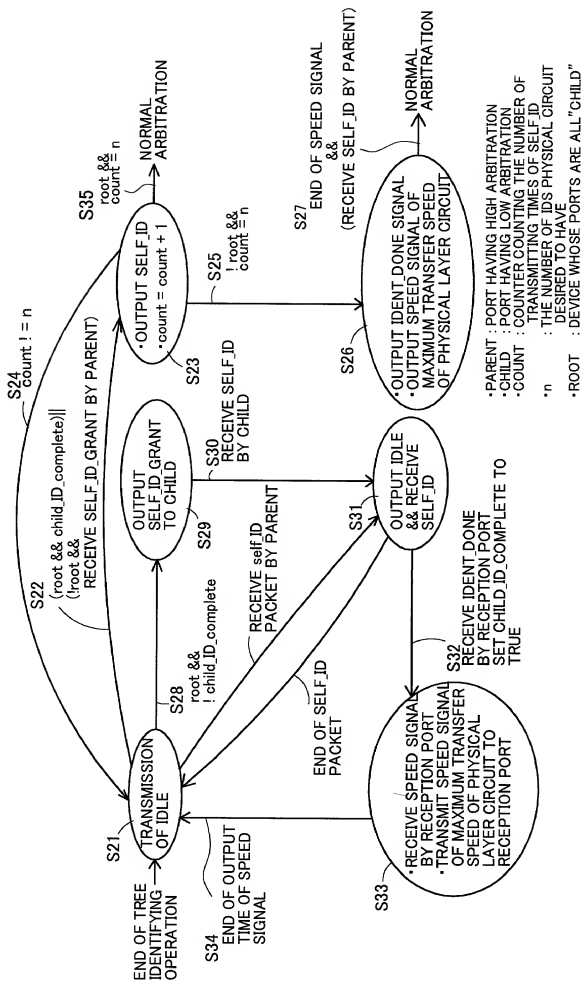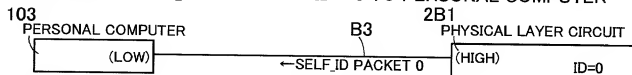- CHILD : PORT HAVING LOW ARBITRATION
- COUNT : COUNTER COUNTING THE NUMBER OF TRANSMITTING TIMES OF SELF_ID
- n : THE NUMBER OF IDS PHYSICAL CIRCUIT DESIRED TO HAVE
- ROOT : DEVICE WHOSE PORTS ARE ALL "CHILD"

NORMAL ARBITRATION

S35
root &&
count ! = n

·OUTPUT SELF_ID
·count = count + 1

S24
count ! = n

S22
(root && child_ID_complete)||
(!root &&
RECEIVE SELF_ID_GRANT BY PARENT)

S25
! root &&
count = n

S23
RECEIVE SELF_ID

OUTPUT
SELF_ID_GRANT
TO CHILD

S30
RECEIVE SELF_ID
BY CHILD

S29
RECEIVE self_ID
PACKET BY PARENT

S26

S27
END OF SPEED SIGNAL
&&
(RECEIVE self_ID BY PARENT)

NORMAL ARBITRATION

·OUTPUT IDENT DONE SIGNAL
·OUTPUT SPEED SIGNAL OF
 MAXIMUM TRANSFER SPEED
 OF PHYSICAL LAYER CIRCUIT

S28
root &&
! child_ID_complete

OUTPUT IDLE
&& RECEIVE
SELF_ID

S31

END OF SELF_ID
PACKET

S32
RECEIVE IDENT DONE
BY RECEPTION PORT
SET CHILD_ID_COMPLETE TO
TRUE

S21
END OF TREE
IDENTIFYING
OPERATION

TRANSMISSION
OF IDLE

S34
END OF OUTPUT
TIME OF SPEED
SIGNAL

·RECEIVE SPEED SIGNAL
 BY RECEPTION PORT
·TRANSMIT SPEED SIGNAL
 OF MAXIMUM TRANSFER
 SPEED OF PHYSICAL
 LAYER CIRCUIT TO
 RECEPTION PORT

S33

16

FIG. 17

SELF–IDENTIFYING OPERATION IN FIRST CONSTRUCTION EXAMPLE OF SECOND EMBODIMENT (IN THE CASE WHERE DEVICE CONNECTED ON THE OTHER SIDE HAS HIGH ARBITRATION)
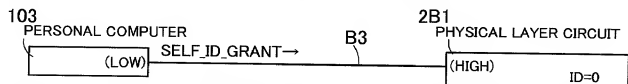
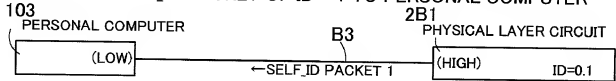(P21) RECEIVE SELF_ID_GRANT FROM PERSONAL COMPUTER

103
PERSONAL COMPUTER   B3   2B1 PHYSICAL LAYER CIRCUIT

(LOW)   SELF_ID_GRANT→   (HIGH)
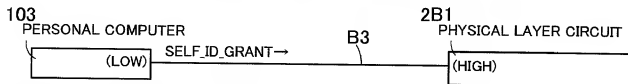
(P22) OUTPUT SELF_ID PACKET OF ID = 0 TO PERSONAL COMPUTER

103
PERSONAL COMPUTER   B3   2B1 PHYSICAL LAYER CIRCUIT

(LOW)   ←SELF_ID PACKET 0   (HIGH)   ID=0

(P23) RECEIVE SELF_ID_GRANT FROM PERSONAL COMPUTER

103
PERSONAL COMPUTER   B3   2B1 PHYSICAL LAYER CIRCUIT

(LOW)   SELF_ID_GRANT→   (HIGH)   ID=0

(P24) OUTPUT SELF_ID PACKET OF ID = 1 TO PERSONAL COMPUTER

103
PERSONAL COMPUTER   B3   2B1 PHYSICAL LAYER CIRCUIT

(LOW)   ←SELF_ID PACKET 1   (HIGH)   ID=0.1

$\vdots$

(P25) OUTPUT SELF_ID PACKET OF ID = n TO PERSONAL COMPUTER

103
PERSONAL COMPUTER   B3   2B1 PHYSICAL LAYER CIRCUIT

(LOW)   ←SELF_ID PACKET n   (HIGH)   ID=0,1···,n
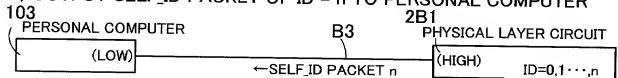
(P26) OUTPUT IDENT_DONE AND SPEED SIGNAL OF MAXIMUM TRANSFER SPEED OF PHYSICAL LAYER CIRCUIT TO PERSONAL COMPUTER AND RECEIVE SPEED SIGNAL 1 FROM PERSONAL COMPUTER
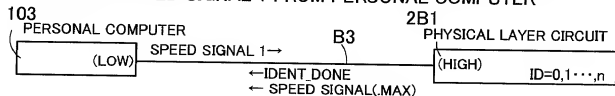
103
PERSONAL COMPUTER   B3   2B1 PHYSICAL LAYER CIRCUIT

(LOW)   SPEED SIGNAL 1→
   ←IDENT_DONE
   ← SPEED SIGNAL(.MAX)   (HIGH)   ID=0,1···,n

(P27) RECEIVE SELF_ID PACKET OF ID = (N+1) FROM PERSONAL COMPUTER AND FINISH SELF–IDENTIFYING OPERATION

103
PERSONAL COMPUTER   B3   2B1 PHYSICAL LAYER CIRCUIT

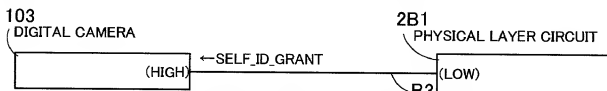ID=n+1   (LOW)   SELF_ID PACKET n+1   (HIGH)   ID=1,2···,n
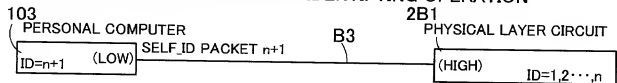
FIG. 18

SELF-IDENTIFYING OPERATION IN FIRST CONSTRUCTION EXAMPLE
OF SECOND EMBODIMENT (IN THE CASE WHERE ARBITRATION OF
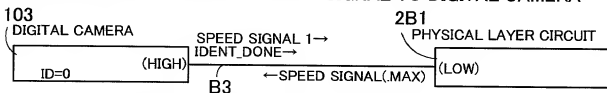DEVICE CONNECTED ON THE OTHER SIDE IS LOW)

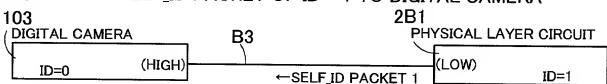(P28) OUTPUT SELF_ID_GRANT TO DIGITAL CAMERA

103
DIGITAL CAMERA   2B1
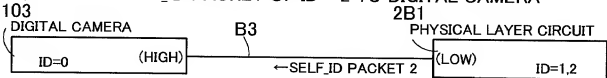   PHYSICAL LAYER CIRCUIT

                    (HIGH)   ←SELF_ID_GRANT   (LOW)
                                               B3

(P29) RECEIVE SELF_ID PACKET OF ID = 0 FROM DIGITAL CAMERA
103   2B1
DIGITAL CAMERA   PHYSICAL LAYER CIRCUIT

                    (HIGH)   SELF_ID_PACKET 0→   (LOW)
                                                B3
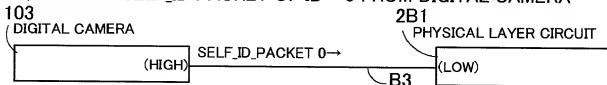
(P30) RECEIVE IDENT_DONE AND SPEED SIGNAL FROM DIGITAL CAMERA
      AND OUTPUT MAXIMUM SPEED SIGNAL TO DIGITAL CAMERA
103   2B1
DIGITAL CAMERA   SPEED SIGNAL 1→   PHYSICAL LAYER CIRCUIT
                         IDENT_DONE→
            ID=0   (HIGH)   ←SPEED SIGNAL(.MAX)   (LOW)
                              B3

(P31) OUTPUT SELF_ID PACKET OF ID = 1 TO DIGITAL CAMERA
103   2B1
DIGITAL CAMERA   B3   PHYSICAL LAYER CIRCUIT

        ID=0   (HIGH)   (LOW)
                         ←SELF_ID PACKET 1   ID=1

(P32) OUTPUT SELF_ID PACKET OF ID = 2 TO DIGITAL CAMERA
103   2B1
DIGITAL CAMERA   B3   PHYSICAL LAYER CIRCUIT

        ID=0   (HIGH)   (LOW)
                         ←SELF_ID PACKET 2   ID=1,2
                              :
                              :

(P33) OUTPUT SELF_ID PACKET OF ID = n TO DIGITAL CAMERA
103   2B1
DIGITAL CAMERA   B3   PHYSICAL LAYER CIRCUIT

                 (HIGH)   (LOW)
        ID=0   ID=1,2···,n
                         ←SELF_IDPACKET n
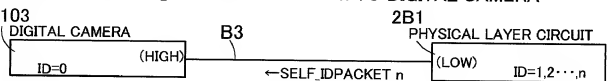
(P34) STOP OUTPUTTING SELF_ID PACKET AND FINISH
      SELF-IDENTIFYING OPERATION
103   2B1
DIGITAL CAMERA   B3   PHYSICAL LAYER CIRCUIT

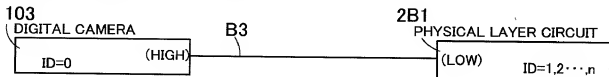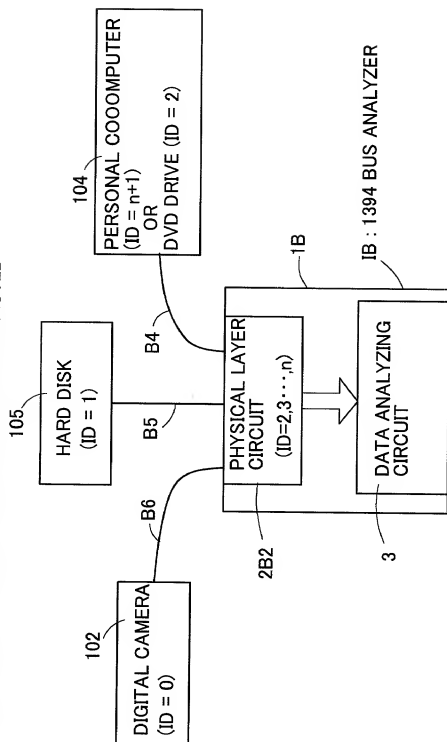   ID=0   (HIGH)   (LOW)
                                                   ID=1,2···,n

FIG. 19

SECOND CONSTRUCTION EXAMPLE OF IEEE 1394 BUS TO WHICH BUS
ANALYZER OF SECOND EMBODIMENT IS CONNECTED

104 PERSONAL COOOMPUTER
(ID = n+1)
OR
DVD DRIVE (ID = 2)

105 HARD DISK
(ID = 1)

102 DIGITAL CAMERA
(ID = 0)

B4

B5

B6

1B

PHYSICAL LAYER CIRCUIT
(ID=2,3···,n)

2B2

DATA ANALYZING CIRCUIT

3

IB : 1394 BUS ANALYZER

FIG. 20

STATE TRANSITION DIAGRAM SHOWING SELF-IDENTIFYING OPERATION IN SECOND
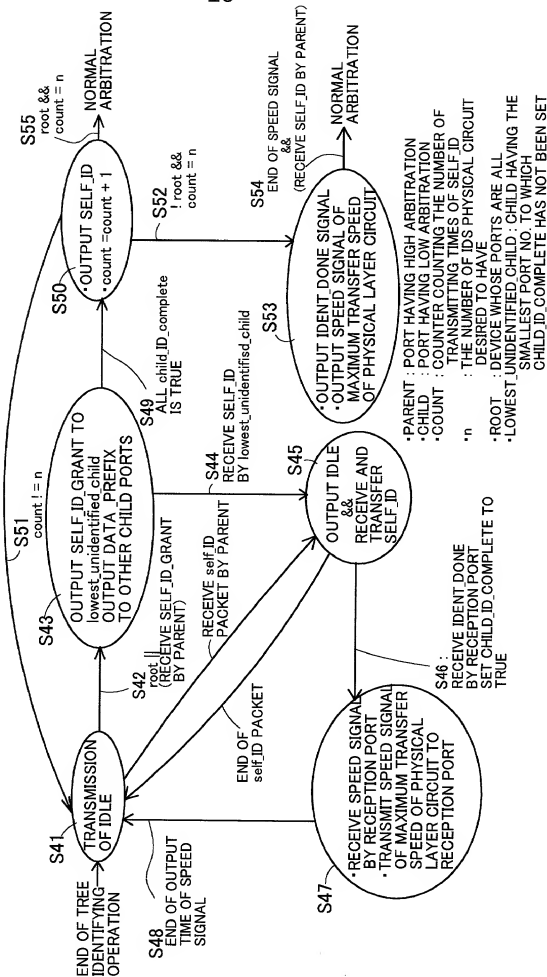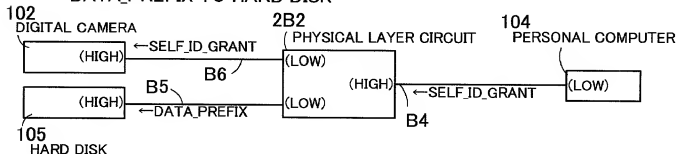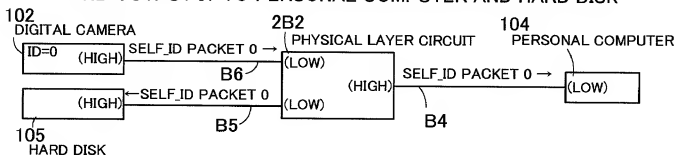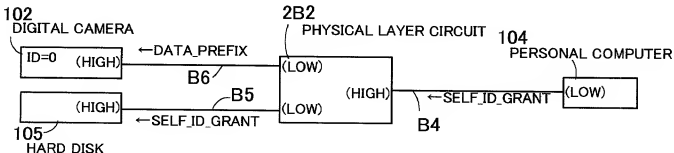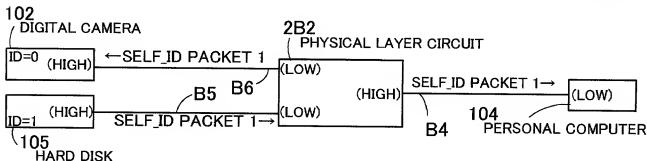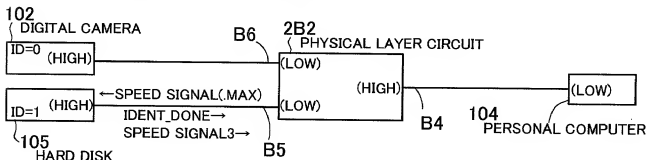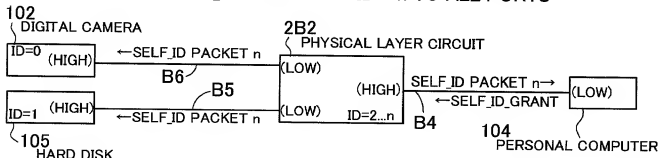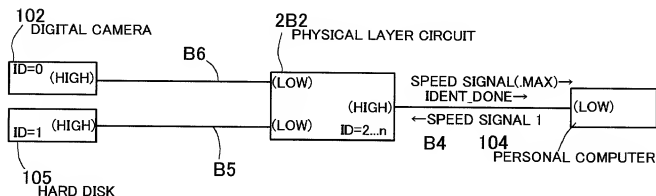CONSTRUCTION EXAMPLE OF SECOND EMBODIMENT

20

FIG. 21

SELF-IDENTIFYING OPERATION (1) IN SECOND CONSTRUCTION
EXAMPLE OF SECOND EMBODIMENT (IN THE CASE WHERE DEVICE
CONNECTED ON THE OTHER SIDE HAS DEVICE HAVING HIGH ARBITRATION)

(P41) RECEIVE SELF_ID_GRANT FROM PERSONAL COMPUTER, OUTPUT
SELF_ID_GRANT TO DIGITAL CAMERA AND OUTPUT
DATA_PREFIX TO HARD DISK

(P42) RECEIVE SELF_ID PACKET OF ID = 0 FROM DIGITAL CAMERA
AND OUTPUT IT TO PERSONAL COMPUTER AND HARD DISK

(P43) RECEIVE IDENT_DONE AND SPEED SIGNAL FROM DIGITAL CAMERA
AND OUTPUT SPEED SIGNAL OF MAXIMUM TRANSFER SPEED
OF PHYSICAL LAYER CIRCUIT TO DIGITAL CAMERA
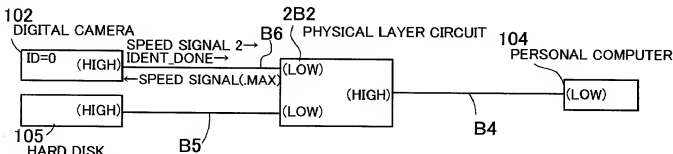
(P44) RECEIVE SELF_ID_GRANT FROM PERSONAL COMPUTER, OUTPUT
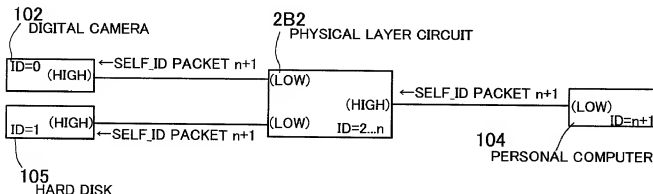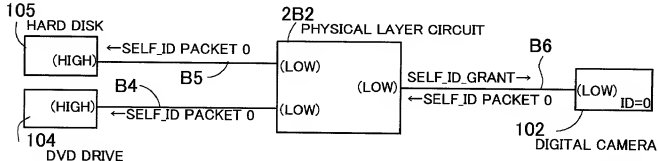SELF_ID_GRANT TO HARD DISK AND OUTPUT DATA_PREFIX
TO DIGITAL CAMERA

FIG. 22

SELF−IDENTIFYING OPERATION (2) IN SECOND CONSTRUCTION EXAMPLE
OF SECOND EMBODIMENT (IN THE CASE WHERE DEVICE CONNECTED ON
THE OTHER SIDE HAS DEVICE HAVING HIGH ARBITRATION)

(P45) RECEIVE SELF_ID PACKET OF ID = 1 FROM HARD DISK AND
TRANSFER IT TO PERSONAL COMPUTER AND DIGITAL CAMERA

(P46) RECEIVE IDENT_DONE AND SPEED SIGNAL FROM HARD DISK
AND OUTPUT SPEED SIGNAL OF MAXIMUM TRANSFER SPEED
OF PHYSICAL LAYER CIRCUIT TO HARD DISK

(P47) RECEIVE SELF_ID_GRANT FROM PERSONAL COMPUTER
AND TRANSMIT SELF_ID PACKET OF ID = 2 TO ALL PORTS
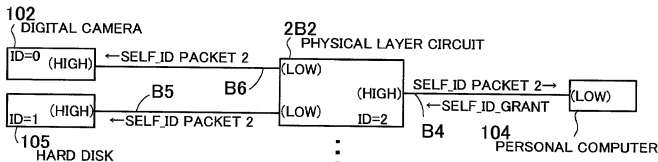
(P48) RECEIVE SELF_ID_GRANT FROM PERSONAL COMPUTER AND
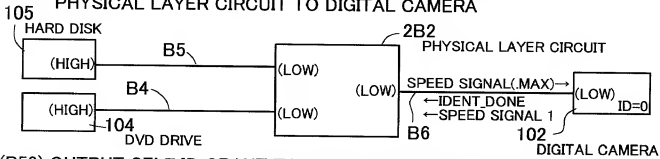TRANSMIT SELF_ID PACKET OF ID = n TO ALL PORTS

FIG. 23

SELF–IDENTIFYING OPERATION (3) IN SECOND CONSTRUCTION EXAMPLE
OF SECOND EMBODIMENT (IN THE CASE WHERE DEVICE CONNECTED ON
THE OTHER SIDE HAS DEVICE HAVING HIGH ARBITRATION)

(P49) OUTPUT IDENT_DONE AND SPEED SIGNAL OF MAXIMUM TRANSFER
SPEED OF PHYSICAL LAYER CIRCUIT TO PERSONAL COMPUTER
AFTER TRANSMITTING PACKET AND RECEIVE SPEED SIGNAL
FROM PERSONAL COMPUTER

(P50) RECEIVE SELF_ID PACKET OF ID = (n+1) FROM PERSONAL
COMPUTER, FINISH SELF–IDENTIFYING OPERATION AND
TRANSFER PACKET TO DIGITAL CAMERA AND HARD DISK

FIG. 24

SELF—IDENTIFYING OPERATION (1) IN SECOND CONSTRUCTION
EXAMPLE OF SECOND EMBODIMENT (IN THE CASE WHERE DEVICE
CONNECTED ON THE OTHER SIDE DOES NOT HAVE DEVICE HAVING
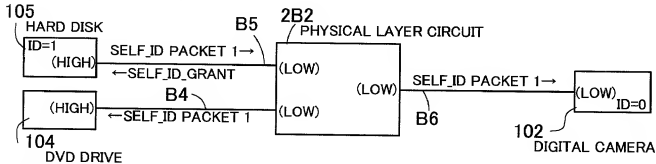HIGH ARBITRATION)

(P51) OUTPUT SELF_ID_GRANT TO DIGITAL CAMERA, RECEIVE SELF_ID
PACKET FROM DIGITAL CAMERA, AND TRANSFER IT TO HARD DISK
AND DVD DRIVE

(P52) RECEIVE IDENT_DONE AND SPEED SIGNAL FROM DIGITAL CAMERA
AND OUTPUT SPEED SIGNAL OF MAXIMUM TRANSFER SPEED OF
PHYSICAL LAYER CIRCUIT TO DIGITAL CAMERA

(P53) OUTPUT SELF_ID_GRANT TO HARD DISK, RECEIVE SELF_ID PACKET
OF ID = 1 FROM HARD DISK, AND TRANSFER IT TO DIGITAL CAMERA
AND DVD DRIVE

(P54) RECEIVE IDENT_DONE AND SPEED SIGNAL FROM HARD DISK AND
OUTPUT SPEED SIGNAL OF MAXIMUM TRANSFER SPEED OF
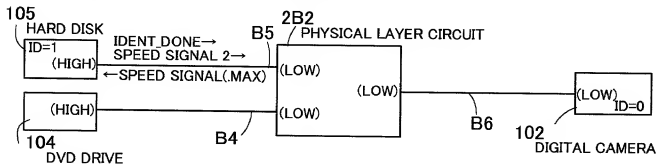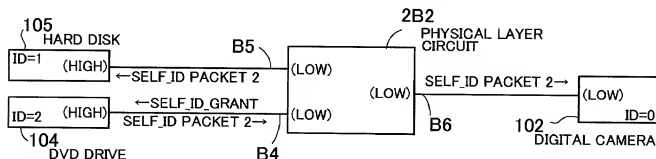PHYSICAL LAYER CIRCUIT TO HARD DISK

FIG. 25

SELF-IDENTIFYING OPERATION (2) IN SECOND CONSTRUCTION EXAMPLE
OF SECOND EMBODIMENT (IN THE CASE WHERE DEVICE CONNECTED ON THE
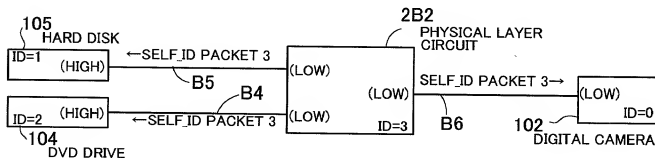OTHER SIDE DOES NOT HAVE DEVICE HAVING HIGH ARBITRATION)

(P55) OUTPUT SELF_ID GRANT TO DVD, RECEIVE SELF_ID PACKET FROM
       DVD DRIVE, AND TRANSFER IT TO DIGITAL CAMERA AND HARD DISK

(P56) RECEIVE IDENT_DONE AND SPEED SIGNAL FROM DVD DRIVE AND
       OUTPUT SPEED SIGNAL OF MAXIMUM TRANSFER SPEED OF
       PHYSICAL LAYER CIRCUIT TO DVD DRIVE
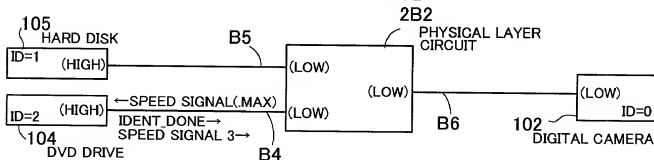
(P57) OUTPUT SELF_ID PACKET OF ID = 3

(P58) OUTPUT SELF_ID PACKET OF ID = n AND FINISH
       SELF-IDENTIFYING OPERATION